

BOOK REVIEW

A First Course on Atmospheric Radiation



GRANT W. PETTY

Sundog Publishing, Madison, Wisconsin;
ISBN: 0-9729033-0-5; 443 pp.; 2004; \$34.

PAGE 341

Textbooks almost never make their authors rich, and Grant Petty already has a day job as an associate professor at the University of Wisconsin, so he must have had something he wanted to say pretty urgently to write *A First Course in Atmospheric Radiation*. He has certainly taken a different approach than the authors of the half-dozen tomes that already exist on the subject. His book is aimed directly at beginning students, and it is written in casual language, short on math and long on physical reasoning and applications to real-world problems. The book may not quite live up to what Petty wants it to be, but it will suit its intended audience much better than anything else available.

In atmospheric sciences departments everywhere, there are many students who are not interested in radiation—dynamics types with a passing interest in physics. Petty has tailored the book for this kind of student in the hopes that he can convey a few important or interesting ideas. Other texts on the subject are rigorous and complete; this one strives to be engaging above all. It is a near-perfect interpolation between, say, Craig Bohren's books, which people gobble up but which lack the math a textbook needs, and books like Kuonan Liou's, which are a dense mass of equations. I will bet that more than a few students actually read through Petty's books.

It helps that Petty has tried to write in a relaxed style. The book has people in it—I, we, and you, mostly—and uses informal language in places, as if Petty were explaining the ideas over a beer in the backyard. In the chapter on reflection from surfaces, for example, he says, "About the only place where you sometimes find true specular reflection...is from the mirror-like surface of a very smooth body of water, such as a pond or lake on a completely calm day." Students respond well to this kind of thing, in my experience, even if it is not always exact and precise. Lots of people like it, actually, and that is understandable—the most exciting ideas expressed in dry and lifeless language sound, well, a little dry and boring.

A First Course is also organized to keep people reading. Every chapter, including the very rudimentary ones that begin the book, ends with one or more applications to the atmosphere (remote temperature sounding, rainbows and halos, and so on) that place the abstract material in context. He covers all the subjects one would typically include in an introductory course at the advanced undergraduate or beginning graduate level, and usually in enough detail (mathematics included) to be pretty useful. The book starts with a very basic introduction to radiation, the electromagnetic spectrum, and reflection and refraction, for readers with a weak physics background; continues with a set of chapters on radiative transfer in the infrared, including a discussion of methods for computing broadband fluxes and concepts from spectroscopy; and concludes with a basic treatment of radiative transfer in the shortwave, including an introduction to cloud and aerosol optics and multiple scattering. The coverage of shortwave subjects is the thinnest, and it is where the gap between what

is in this book and what is necessary to start working in the field is largest.

Petty created Sundog Publishing (named for his after-hours rock-and-roll band) to publish and distribute this textbook himself. That might explain the larger-than-usual share of production errors (misspellings, cross-reference markers, etc.) that show up in the final product. But more important, the manuscript seems not to have been edited well. Good editors work like sculptors, creating by removing, and the writing here would be stronger and more consistent if someone had trimmed away some of the fat. On the other hand, self-publishing lets Petty sell the book cheaply: just \$34, including shipping to U.S. addresses, for which he will earn the gratitude of students everywhere.

So what is not to like? Well, the problems are boring. Far too many are rote, "plug and chug" questions, that require only that students substitute numerical values into equations and do some arithmetic. Others ask students to derive results demonstrated in the text, with little motivation or background. That is a little puzzling for an author who has devoted so much time to finding interesting and relevant examples to use by way of explanation. There is no reason, even at this level, not to ask students to think.

What is more disconcerting, though, is that Petty often backslides from the comfortable, chatty-older-brother voice into the more typical stiff, pedantic-bachelor-uncle voice we are used to hearing in scientific writing. The clash of styles is distracting, making the tedious bits feel like a bucket of cold water.

But perhaps that is not a fair complaint—no one would ever notice if the rest of the book were not so good.

—ROBERT PINCUS, Climate Diagnostics Center, Boulder, Colo.